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DiPoto et al.

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[54] SUTURE ANCHOR AND DRIVE ASSEMBLY

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[52] U.S. Cl. 606/232; 606/72; 606/73

[58] Field of Search 606/65, 73, 86, 606/104, 139, 170, 220, 232

[56] References Cited

U.S. PATENT DOCUMENTS

2,329,398	9/1943	Duffy	.....	606/104
3,845,772	11/1974	Smith	.....	606/104
4,409,974	10/1983	Freedland	.....	128/92
4,454,875	6/1984	Pratt et al.	.....
4,496,468	1/1985	Li	.....	606/232
4,532,926	8/1985	O'Holla	.....	606/139
4,632,100	12/1986	Somers et al.	.....	606/73
4,653,486	3/1987	Coker	.....	128/92
4,669,473	6/1987	Richards et al.	.....
4,738,255	4/1988	Goble et al.	.....	606/86

4,776,328	10/1988	Frey et al.	.....	128/92
4,895,148	1/1990	Bays et al.	.....	606/213
4,968,315	11/1990	Gattuma	.....	606/72
5,002,550	3/1991	Li	.....	606/139
5,037,422	8/1991	Hayhurst et al.	.....	606/72

FOREIGN PATENT DOCUMENTS

0260970	3/1988	European Pat. Off.	.....
2606270	5/1988	France	.....
WO89/01767	3/1989	WIPO	.....
WO89/10096	11/1989	WIPO	.....

OTHER PUBLICATIONS

Arthrex Brochure—"Arthrex ESP System: Expanding Suture Plug"—Feb., 1991? [Published prior to Mar. 1, 1991].

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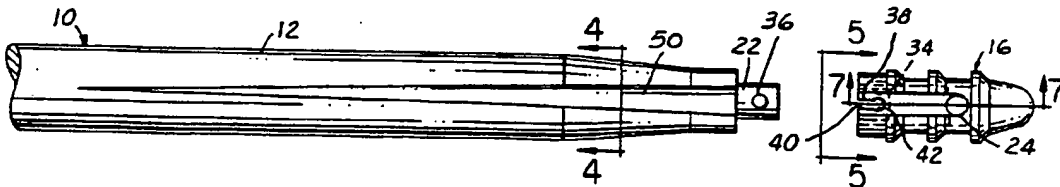
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[57]

ABSTRACT

A suture anchor and anchor driver device for securely and accurately positioning and installing the suture anchor in place. The anchor has a rounded or pointed head and one or more ridges around it to help force fit the anchor into a hole and to hold it in place. A suture is positioned through the anchor for subsequent use during the surgical procedure. The driver device has a handle and an elongated shaft and is used to position and install the anchor in place. The anchor preferably snap fits onto the end of the shaft. A depth guide can be integrally or removably positioned on the shaft to ensure correct depth of placement. Alternately, the driver shaft is hollow and the anchor is positioned inside it and is implanted with a pusher member. The ends of the suture are affixed to the driver handle. Grooves can be provided on the driver and the anchor to prevent the suture from interfering with the positioning and installation procedure.

18 Claims, 9 Drawing Sheets



606/232; 606/72; 606/73